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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/810,965

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Yen-Ming Chen

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47390

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08/23/2005

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EXAMINER

TRINH, HOA B

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/810,965	<b>Applicant(s)</b> CHEN ET AL.	
	<b>Examiner</b> Vikki H. Trinh	<b>Art Unit</b> 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2005.
- 2a) ☒ This action is **FINAL**.      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 29-34 and 36-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 29-34 and 36-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Acknowledgement*

Applicant filed an amendment on May 23, 2005, has been considered. Claims 29-34 and 36-38 are pending in this present application. Claim 35 has been canceled.

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 29-34, 36-38 are rejected under 35 U.S.C. 102(b) as being anticipated by Beddingfield (5,977,632).

As to claims 29, and 37-38, Beddingfield discloses a solder bump for interconnection of a flip chip device comprising a semiconductor surface 10 (fig. 5), a passivation layer 16 26, 28 (fig. 5) over said semiconductor surface 10 (fig. 5); at least a contact pad 12, 13 (fig. 5) created over the semiconductor surface 10; the passivation layer 16 (fig. 5) exposing said at least one contact pad 13, 12 (fig. 5); an UBM 24, 22 (fig. 5) created over the at least one contact pad 12, 13 (fig. 5), a lateral dimension of the UBM layer 22 being limited to be within lateral dimension or being limited to a size approx. the same as lateral dimension of the at least one contact pad 12

(col. 3, lines 50-51); and at least one solder compound 26, 28 (fig. 5) overlying the UBM layer, wherein the solder compound comprises an approx. flat top (fig. 5 or fig. 7) surface and convex sidewalls (fig. 5) before connecting to other components. Note: the phrase “approx. flat top” is interpreted broadly and to denote a relative term.

As to claims 30, 31, UBM 22, 24 (fig. 5) comprising a layer of chromium followed by a layer of copper followed by a layer of gold (col. 3, lines 48-51).

Note: Beddingfield teaches that UBM structure as a “composite” layer (col. 3, line 49). The term “composite” is to mean distinct parts or individuals making up a group. See <http://www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=composite>.

As to claim 32, the passivation layer has a plurality of passivation layers 16, 18, 20 (fig. 5).

As to claim 33, the plurality of passivation layers 16, 18, 20 (fig. 5) are photosensitive polyimide (col. 3, lines 5-10).

As to claim 34, the at least one contact pad 12, 13 (fig. 5) being electrically connected with “a” semiconductor device with at least one conductive line of interconnect or with one conductive contact point (fig. 5)

As to claim 36, a seed layer 18, 20 (fig. 5) is deposited over the patterned layer of passivation 16 (fig. 5).

3. Claims 29 and 37-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Fang et al. (6,737,353) (hereinafter Fang).

As to claims 29, and 37-38, Fang discloses a solder bump 150 (fig. 6) for interconnection of a flip chip device comprising a semiconductor surface 110 (fig. 6), a passivation layer 130

(fig. 6) over said semiconductor surface 110 (fig. 6); at least a contact pad 120 (fig.65) created over the semiconductor surface 110; the passivation layer 130 (fig. 6) exposing said at least one contact pad 120 (fig. 6); an UBM 140 (fig. 6) created over the at least one contact pad 120 (fig.6), a lateral dimension of the UBM layer 140 being limited to be within lateral dimension or being limited to a size approx. the same as lateral dimension of the at least one contact pad 120 (fig. 6); and at least one solder compound 150 (fig. 6) overlying the UBM layer, wherein the solder compound 150 comprises an approx. flat top (fig.6) surface and convex sidewalls (fig. 6) before connecting to other components.

***Response to Arguments***

4. Applicant's arguments filed 05/23/05 have been fully considered but they are not persuasive.

The newly amended claim 29 and the new claims 37-38, the phrase "lateral dimension of the UBM being limited to be within a lateral dimensions of the at least one contact pad" is met by the cited reference, because in col. 3, lines 50-51, the reference teaches that the UBM structure exists within the perimeter of the pad. Thus, the rejection using the cited reference is maintained.

Regarding to the structures 26, 28 of Beddingfield, applicants argue that the structures are spherical before connecting to other components. On the contrary, Beddingfield teaches the claimed invention because applicants broadly use the phrase "approx. flat top" . Even if applicants have met narrowly, Beddingfield would still satisfy the claimed invention because the "top" of the solder is a relative term. Further, applicants claim a device claim and not an intermediate device claim. Therefore, Beddingfield's device meets every element of the claims.

Newly reference Fang is used to reject the newly amended claims 29 and the new claims 37-38.

### **Conclusion**

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Vikki Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Wael Fahmy, can be reached at (571) 272-1705. The office fax number is 703-872-9306.

Any request for information regarding to the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Also, status information for

published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. If you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Lastly, paper copies of cited U.S. patents and U.S. patent application publications will cease to be mailed to applicants with Office actions as of June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site ([www.uspto.gov](http://www.uspto.gov)), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy. Requests to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.

Vikki Trinh,  
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LONG PHAN  
PRIMARY EXAMINER